

CLAIMS

See
a) What is claimed is:

1. A wavelength division multiplexed optical system comprising:

5 a plurality of optical transmitters, each transmitter configured to transmit information at via at least one signal wavelength at a bit transmission rate and signal power; and,
a plurality of optical receivers, each receiver configured to the receive information transmitted via at
10 least one of the at least one optical wavelengths, wherein the at least one signal wavelength and bit transmission rate of each of said plurality of transmitters is selected to allow for the transmission of the information via the signal wavelength to at least a corresponding one of said plurality
15 of said receivers without regeneration, wherein information transmitted at a first bit transmission rate and first signal power to a first receiver without regeneration would require at least one of electrical regeneration and optical regeneration to reach a second receiver.

20 2. The system of claim 1, wherein at least a portion of said plurality of transmitters optically communicate with at least a portion of said plurality of optical receivers through at least one of an optical router and add/drop device.

25 3. The system of claim 1, wherein said system is configured as a continuous optical path configured to carry signal wavelengths.

4. The system of claim 3, wherein said system includes a plurality of optical access ports configured to allow optical
30 signal wavelengths to be transmitted into and received from said optical path and to prevent optical signal wavelengths from completely traversing said continuous path.

5. The system of claim 4, wherein said plurality of access ports includes at least one of an optical transmitter and an optical receiver.

6. The system of claim 4, wherein said plurality of
5 access ports includes at least one of an optical switch and an add/drop multiplexer configured to insert and/or remove optical signal wavelengths from said path.

7. The system of claim 1, wherein:
at least one of said plurality of optical transmitters
10 includes an inverse multiplexer configured to separate a high bit rate signal into a plurality of lower bit rate signals, said at least one transmitter being further configured to upconvert at least two of the lower bit rate signals onto corresponding signal wavelengths; and,
15 at least one of said plurality of optical receivers includes an inverse demultiplexer configured to receive said plurality of lower bit rate signals from said at least one receiver and provide the high bit rate.

8. The system of claim 7, wherein at least one of said
20 plurality of optical transmitters is configured to transmit information at the high bit rate to at least one of said plurality of receivers without regeneration.

9. The system of claim 1, wherein:
at least one of said plurality of optical transmitters
25 includes an electrical multiplexer configured to combine system information with communications traffic information and transmit the system and communications traffic information via at least one of the signal wavelengths; and,
at least one of said plurality of optical receivers
30 includes an electrical demultiplexer configured to separate the system information from the communications traffic information.

10. The system of claim 9, wherein said system includes an add/drop multiplexer configured to remove and insert the at least one signal wavelength carrying the system information combined with communications traffic and at least one other signal wavelength carrying only communications traffic.

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11. A method of transmitting information in an optical system comprising:
providing an optical path including at least first and second optical receivers configured to receive at least one signal wavelength from the optical path;
transmitting first information via a first signal wavelength at a first bit transmission rate and first signal power sufficient to be received by the first optical receiver without regeneration; and,
transmitting second information via a second signal wavelength at a second bit transmission rate and second signal power sufficient to be received by the second optical receiver without regeneration, wherein transmitting information at the first bit transmission rate and first signal power to the second receiver would require at least one of electrical regeneration and optical regeneration.

12. The method of claim 11, wherein:
said providing includes providing a plurality of optical receivers configured to each receive at least one signal wavelength; and,
said transmitting a second information set includes transmitting a plurality of information via a plurality of signal wavelengths at different bit transmission rates and signal powers sufficient to be received by at least one of the plurality of optical receivers without regeneration.

13. The method of claim 11, wherein said transmitting a first information includes transmitting the first information at the highest suitable bit transmission rate and signal power that can be received by said first optical receiver
5 without regeneration.

14. The method of claim 12, wherein said transmitting the plurality of information via a plurality of signal wavelengths includes transmitting the plurality of information via a plurality of signal wavelengths that
10 minimize the transmission loss in the optical path.

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